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ABSTRACT

This chapter presents Hutchinson's Metamethodology, which is a methodology for building methodologies. The methodology is composed of a set of rules and procedures that, when followed and applied to any problem area, will result in a systematic set of procedures for dealing with that problem area. The following major processes of the methodology are described: (1) preparation process; (2) choice of a problem area; (3) choice of a purpose for the methodology; (4) test for acceptability; (5) analysis of the implications of the purpose for the general steps that the methodology should contain; (6) production of an operational definition of the purpose of the methodology; (7) production of detailed operational steps of the methodology; and (8) performance of research on the methodology in order to identify problems and correct them. Seventeen figures are provided. (30 references) (Author/EW)

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Chapter 6

Metamethodology

Thomas E. Hutchinson

The literature of ID is filled with flow-charts and step-by-step procedures. They are designed to enable the development process to be conducted as a technological procedure, producing identical outcomes no matter who the developer is. As we all know, this is an ideal; the use of these procedures may, at the best, make the design of instruction a technological art, and at worst they may so mislead the artist that the resulting instruction is worse than it would have been without their use. How can such procedures be designed so that the resulting methodologies more clearly approach our ideal? The following chapter presents an answer to this question.

METHODS AND METHODOLOGIES

When two people use the same word they don't necessarily mean the same thing (Hutchinson and Benedict, 1970). This phenomenon, which is used to advantage by poets and novelists, is a problem for scholars. Scholars wish to convey exact meaning. For this reason, scholars often construct new definitions of terms so that the audience will be less likely to misunderstand what they mean when they use those terms again.

The word "methodology," for example, is used in different ways. One can refer to the methodology of a study and mean the particular design of a particular experiment. People say that they study research methodology and mean that they study the tools and techniques that are used in research. For the purposes of this paper the word "methodology" is defined as a systematic, operational, standard set of rules and procedures designed to accomplish an operationally-defined purpose (Hutchinson, 1972). The word "method" is defined as a general set of guidelines for the accomplishment of a task.

Given these definitions, most of the tools that exist in the social sciences are methods. Most of the tools that exist in statistics, a branch of mathematics, are methodologies. In the social sciences we have research methods, teaching methods, evaluation methods, and needs-assessment methods. There are inherent weaknesses in methods. It is possible for two people to follow the same method of needs-assessment in very similar circumstances, but have a very different result in the degree to which the task is accomplished. In general, methods allow for variations in performance which may seriously affect the quality of the result.

Given a certain task, it may be difficult to determine if a particular method is appropriate or not. Some methods have no stated purpose other than what might be implied by the name of the method. For some methods, it is claimed that there are many different purposes which can be accomplished through its use. There are no methods for which the purpose of the method is operationally defined so that a person can be entirely sure of what the method is designed to

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accomplish.

It is often possible to find several variations of the guidelines for the use of a method. It may be unclear which variation should be used in one particular set of circumstances. When people report their results, it may be unclear which variation of the method was used.

Some methods are in the form of checklists. The person using the method is to do all the steps, but the order in which they are to be done is not specified. The results of using such a method will be highly variable if the order of the steps does make a difference.

The steps of a method are general. It is possible for two people doing the same step under very similar circumstances to select very different activities and perform them in very different ways. The more general and imprecise the steps of a method are, the greater the variation in the resultant performance can be.

A methodology is a more scientific process. It is much more thorough than a method. Methodologies do not have the inherent weaknesses of methods.

A methodology is composed of precise steps at a level of operational detail. There is a specific prescribed sequence in which the steps are to be performed. If any alternative versions of a methodology exist they are carefully named, so that users may know and report exactly what procedures were used. A methodology has an operationally-defined purpose. Everyone may understand the purpose of the methodology in the same way because the purpose is clear and unambiguous.

It is because a methodology is an operational, systematic, standard set of rules and procedures designed to accomplish a defined purpose that a methodology can be scientifically tested. It is because a methodology can be scientifically tested that the development of a methodology can proceed as a scientific process.

When a methodology is implemented for the purpose of testing, because the purpose is operationally defined, the extent to which the purpose has been accomplished can be measured. Because the steps of a methodology are operational, people can know what was done to produce the measured result. Thus people are in a better position to identify where problems may have occurred, to attempt rectification and to test the modifications made. It is expected that repeated testing and redesigning will result in the development of a methodology which will increasingly accomplish its purpose whenever it is applied.

SOME METHODOLOGIES UNDER DEVELOPMENT

There is a developing body of successful work in the area of building methodologies for the social sciences. The development of methodology has occurred and is occurring in both the conclusion-oriented area (basic social science inquiry) and the decision-oriented area (applied social science or social engineering). The methodologies being developed in the decision-oriented area can be placed into three categories: those concerned with needs for information, those concerned with providing educational services, and other methodologies.

There are five methodologies which are primarily concerned with collecting information. The Needs-Analysis Methodology is concerned with pro viding needs-data for decision-making (Coffing et al, 1973; Coffing and Hutchinson, 1974; Thomann, K., 1976; and Brush, 1976). The Client-Demand Methodology is concerned with producing information about client demands (Coffing, 1973). The Participatory Needs-Analysis Methodology for Community Planning is concerned with having a community of people be able to determine and measure their own needs from their own perspective (Aponte, 1978). The Evaluation Methodology is concerned with providing data about an enterprise for decision-making (Benedict, 1973a, 1973b and 1974; Gordon, 1973; Jeffers, 1974; Rosen, 1974; Mitchell, 1975; and Hutchinson, 1976). The Operationalization of Fuzzy Concepts Methodology is concerned with having a person be able to produce an operational definition of a complex vague term (Hutchinson and Benedict, 1970; Coffing, et al, 1971; and Jones, 1971).

There are three methodologies which are primarily concerned with providing educational services. The Instructional Simulation Design Methodology involves procedures to develop simulated experimental techniques for the accomplishment of defined learning objectives (Thomann, J., 1973). The Methodology for Teaching by Inquiry is concerned with a self-directed mode of learning in which the student selects and organizes learning activities for the accomplishment of a goal (Hoagland, 1972). The Methodology to Develop Humanistic Psychological Education Curricula is concerned with how to develop new ways of having learners attain humanistic goals and objectives (Brooks, 1975).

There are three other methodologies that are in the decision-oriented area. The Decision-Making Methodology is concerned with helping a person to make decisions that are optimal with respect to what that person desires (Heffernan, 1976 and Hodson, 1974). The Dissemination Methodology is a methodology for technology transfer and is involved with meeting needs through the dissemination of products (Welsh, 1976). Metamethodology is a process for building a methodology for any definable purpose. (Thomann, J., 1973 and Hutchinson and Thomann, J., 1975).

In the area of conclusion-oriented research there are two methodologies. There is a general Knowledge-Generation Methodology (Hutchinson, 1974 and 1975 and Figueroa de Guevara, 1977). There is also a specialized methodology for the development of knowledge in the area of linguistics (Mehta, 1975).

METAMETHODOLOGY DESCRIBED

There is a methodology for building methodologies, called Metamethodology. The purpose of Metamethodology is to build a methodology for any definable purpose. Metamethodology is composed of systematic, operational, standard set of rules and procedures. These rules and procedures are organized into a small number of major processes. These major processes will be briefly described.

The first major process is the Preparation Process. In the Preparation Process a person learns how to apply Metamethodology and makes plans for the use of the resources that are available for building a methodology.

In the next major process a person chooses a problem-area. For example, needs assessment.

In the next major process the person chooses a purpose for the methodology s/he will build. This is done by studying the problem-area, the tools that now exist in the problem-area, and what purposes the literature of the problem-area state or imply. Some initial testing of the acceptability of the purpose is also done here.

In the fourth major process the chosen purpose is carefully tested for acceptability. Desirability, definability, and practicality of the purpose are considered.

In the next major process the person analyzes the implications of the purpose for the general steps that the methodology should contain. These general steps are then arranged in a rational sequence.

In the next major process the person produces an operational definition of the purpose of the methodology.

In the seventh major process the person produces the detailed operational steps of the methodology. This is done by identifying subpurposes, analysis of the implications of the subpurposes, ordering the implications, and performing tests of logic at several levels.

In the last major process the person performs research on the methodology in order to identify problems and to correct them. This process proceeds from simple to complex tests and may go on for quite a long time.

Version I of Metamethodology is the next section of this paper. The rules and procedures of Metamethodology are documented in a manner similar to that used with a computer program. After the first step is performed, the user drops down to the next, unless the step directs the person to go to some other part of the methodology. There is substantial branching and looping built into the procedures. For these reasons it is very difficult to understand the procedures from a simple sequential reading of the steps and it would be preferable to work through the steps with a sample problem. The Metamethodology is designed to be effective in its entirety. No particular step is expected to be effective for every application.

METAMETHODOLOGY—VERSION I*

I. Prepare to use Metamethodology
- A. Learn how to apply Metamethodology
  1. Take a course on Metamethodology, if a course is available.
  2. Read the following documentation on Metamethodology.
     a. Hutchinson, Thomas E. Metamethodology, Photocopy, University of Massachusetts, 1978.
     b. Thomann, James. Metamethodology: The First Field Test. Unpublished doctoral dissertation, University of Massachusetts, 1973.
     c. Coffing, Richard T. Identification of Client Demand for Public Services: Development of a Methodology. Unpublished doctoral dissertation, University of Massachusetts, 1973.
- B. Decide how to use the available resources
  1. Determine how much of what resources are available to be used in the development of a methodology.
  2. Allocate the actual amount of your time available or 100 hours of your time, whichever is smaller, as suggested in Figure 6-A.
  3. When these allocations are used up, allocate half of the remaining resources as you choose in Figure 6-A.
  4. When these allocations are used up, allocate the remaining resources as you choose in Figure 6-A.
  5. If any resources remain, go to step II.
  6. Get more resources and go to step I.B.3.

II. Choose a problem
- A. The simple method
  1. Make a list of your professional interests on Figure 6-B.
  2. For each interest, make a list of the problems in this area.
  3. Circle the problem that you would most like to do some work to solve.
  4. If you are satisfied with this choice, skip to step III.
- B. The moderate method
  1. On Figure 6-B circle the interest that you would most like to explore.
  2. On Figure 6-C make a list of the published materials that describe the problems in this area.

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*Metamethodology--Version I is a modification of Metamethodology, Draft IX, by Thomas E. Hutchinson and James B. Thomann, Photocopy, October, 1975.

Major Process	First 100 Hours or Less %	First 100 Hours or Less Amount	Second Allocation	Third Allocation
II	5			
III	10			
IV	10			
V	20			
VI	10			
VII	35			
VIII	10			

Figure 6-A. Resource allocation chart.

List of Interests	List of Problems

Figure 6-B. Interests and problems.

List of Materials	List of Problem Statements

Figure 6-C. Materials and problem statements.

3. Read each piece of material and list the problem-statements.
4. Circle the problem-statement that you would most like to do some work to solve.
5. If you are satisfied with this choice, skip to step III.

C. The complex method. Use Coffing's Client-Demand Methodology. (See step I.A.2.C.)

III. State a purpose for your methodology

A. Analyze the problem-area

1. On Figure 6-D, enter the problem-area you have chosen.
2. Make the following lists:
   a. Literature about the problem.
   b. People who have done work on the problem.
   c. Work being done on this problem.
   d. Tools that have been developed to help solve the problem.
3. Circle those items that you have the time to (read, talk to, go and see, or try out) and which are available.
4. Do each of these circled activities and whenever you read, hear or think of a purpose-statement that, if accomplished, might solve the problem, write it down on Figure 6-E.
5. If the problem-area seems to be too large, repeat steps one through four above with a smaller problem-area.
6. Now circle that one purpose on Figure 6-E which best describes what needs to be accomplished in order to solve the problem.

B. Test the purpose

1. Can some unimportant event occur which would satisfy this purpose?
2. If so, change the purpose and test it again until your purpose is sufficiently demanding.
3. Imagine that your purpose is being accomplished. Could the problem still exist? If so, change the purpose and test it again.
4. If resources warrant, show the purpose to others for their critique based upon the above two criteria.
5. Write out the purpose and commit yourself to it. (If you can say why you don't like it, then revise and recycle to B.1. If you can't say why you don't like it, then go on to Step IV.)

IV. Test the purpose by the following criteria:

A. Do you know enough?

1. List the names of three people whom you consider to be experts about your chosen problem.
2. Does your name belong on this list?
3. If not, study the problem through activities on Figure 6-D until it is reasonable to add your name to the list; or go back to step II and choose another problem, perhaps a smaller problem.

B. Is the purpose desirable?

1. Do you think people concerned with this problem would find your purpose desirable? Why or why not?
2. If you are not sure of your answer to number one above, ask people who are concerned with the problem if they find your purpose desirable.
3. If you are not sure of the answer now, check the literature to see if the purpose is desirable.
4. If you are still not sure of the desirability of the purpose, use Coffing's Client-Demand Methodology (see step I.A.2.c.).
5. If you have decided that the purpose is sufficiently desirable, proceed;

_____
(name of problem area)

Lists

Literature	
People	
Work Being Done	
Tools Available	

Figure 6-D. Sources of purpose statements.

_____
(name of problem area)

Purpose Statement	Source

Figure 6-E. Purpose statements.

otherwise go back to step III to choose another purpose or to step II to choose another problem.

C. Is the purpose definable?
   1. Imagine a situation in which your methodology is being used. Imagine that your methodology is working and your purpose is being accomplished. What can you see about this situation that indicates to you that your purpose is being accomplished? Write your answer.
   2. If you can't write anything, go back to step III; otherwise continue.
   3. Repeat step III.B in light of the partial definition and revise, if necessary.

D. Is the purpose practical?
   1. Answer the question yourself in terms of:
      a. Is the development of a methodology practical, given this purpose?
      b. Once developed, would the methodology be a practical way to accomplish the purpose?
   2. Get other people to answer questions 1.a. and 1.b. above.
      a. Methodologists answer question C.1.a.
      b. Methodologists and potential users answer question C.1.b.
   3. Revise the purpose if necessary and recycle through A., B. and C.; otherwise continue.

E. Are existing methodologies insufficient?
   1. Review the literature in your area of interest and search for methods and methodologies which exist in the area. List those methods and methodologies on Figure 6-F, Column 1 and the source of each in Column 2. If there are no methods or methodologies in your area, skip to step F.
   2. For each method or methodology listed on Figure 6-F, if it does not consist of a systematic, standard and operational set of procedures with a defined purpose, place an X in Column 3 of Figure 6-F.
   3. Consider further only those methodologies which do not have an X in Column 3. Check each remaining methodology to see if it is designed to accomplish the purpose of your methodology. If it is not designed to accomplish your purpose, place an X in Column 4 of Figure 6-F.
   4. Do not consider further any methodology which has an X in either Column 3 of Column 4. Check each remaining methodology to see if it actually does accomplish your purpose. If it does not accomplish your purpose, place an X in Column 5 of Figure 6-F.
   5. Do not consider further any methodology which has an X in Column 3, Column 4 or Column 5. Check each remaining methodology to see if it is a practical way to accomplish your purpose. If it is not practical, place an X in Column 6 of Figure 6-F.
   6. Do not consider further any methodology which has an X in Columns 3, 4, 5, or 6. Check each remaining meth-

(1) Name of Method or Methodology	(2) Source	(3) Methodology	(4) Designed for Your Purpose	(5) Does It Accomplish Your Purpose	(6) Practical	(7) Desirable	(8) Complete

Figure 6-F.

odology to see if it is a desirable methodology. If it is not desirable, place an X in Column 7 of Figure 6-F.

7. Do not consider further any methodology which has an X in Columns 3, 4, 5, 6, or 7. Check the remaining methodology to see if the methodology is completely developed. If the methodology is completely developed, then there is no need for you to build such a methodology. Go to step II and choose a different problem. If the methodology is not fully developed, you could, if you wish, work on the further development of this methodology rather than build a methodology of your own. If the methodology is not complete, place an X in Column 8 of Figure 6-F.
8. If for each method or methodology on Figure 6-F there is an X in Columns 3, 4, 5, 6, or 7, then it is reasonable for you to build a methodology for your purpose. Otherwise, you should either choose a new problem or possibly work on the further development of a methodology which is not complete.

F. If you are sure that you are prepared to use your valuable time to build a new methodology to accomplish this purpose, then proceed to do so. If for any reason you are not ready to do this, go back to whatever point in metamethodology you wish and reconsider the decisions you made.

V. Analyze the implications of the purpose for the development of methodology. (This is a way of identifying the attributes that the methodology must have.)

A. Use the following method to analyze the implications of the purpose. (The implications of the purpose supply the first approximation of the major elements of the methodology.)
1. On Figure 6-G, write down in what ways you could fail to accomplish your purpose.
2. On Figure 6-G, write down in what ways you can accomplish your purpose, avoiding all the problems.
3. Imagine a situation in which your purpose is being accomplished. Write down what is being done to accomplish the purpose on Figure 6-G.
4. If an experienced methodologist is available, ask her or him to do steps one through three above on your purpose. Otherwise, ask someone who is available and who would be most knowledgeable about the problem-area.
5. Consider the ideas you get from others in step 4 above and add to Figure 6-G further ways to accomplish your purpose.

B. Choose the initial set of major processes for the methodology.
1. Cross off the list of elements on Figure 6-G--Ways to Accomplish--all of those elements that you decide it is not necessary to accomplish.
2. Where two items or more are similar and only one is needed, cross off those you will not need.
3. Write the items that have not been eliminated on Figure 6-H under the heading, Selected Ways to Accomplish the Purpose.

C. Organize the attributes into a rational order of steps.
1. On the list of Selected Ways to Accomplish the Purpose on Figure 6-H, which one would have to be accomplished first in order to accomplish the rest? Write it down as number one (1) under the heading, Ordered Ways to Accomplish the Purpose.
2. If this first element were actually accomplished, which one of the remaining elements above would now have to be accomplished in order to accomplish the rest? Write it down as number two (2).
3. If these first two elements were actually accomplished, which one of the remaining elements would be next? Write it down as number three (3).
4. Continue this process until you have put all the items into order.
5. Check over the ordered ways of accomplishing the purpose on Figure 6-H. Is this order logical?
6. Make any changes that are necessary.
7. For each item on Ordered Ways of Accomplishing the Purpose on figure H, check to see if the item is stated procedurally. For example, if a step reads "objectives," it is not stated procedurally.
8. If an element is not stated procedurally, rewrite it so that it is.
9. These elements are now the major processes of your methodology.
10. Rewrite these major processes on Figure 6-I next to the appropriate number.

D. Test the completeness of the major processes.
1. Look at step 1 on Figure 6-I and ask yourself if anything has to be done before this step in order to accomplish the purpose. Consider the following possibilities: Do you need to obtain resources in order to do the methodology? If someone else were

using your methodology, would s/he need to learn how to use it first? Would you need to plan the application of the methodology in terms of resources or time?

2. If so, write them down next to A., B. and C. on Figure 6-I.
3. Look at the last numbered step on Figure 6-I and ask yourself if anything has to be done after this step in order to accomplish the purpose. Consider the following possibilities: Do you need to evaluate the success of the application of your methodology? Do you need to plan to go back to some point in your methodology if there has been some lack of success?
4. If so, write them down next to X., Y. and Z. on Figure 6-I.
5. Show Figure 6-I to an experienced methodologist and ask her/him to critique it and make suggestions.
6. Consider the comments and suggestions and make whatever changes you decide are appropriate.

E. Complete the first draft of your methodology.
   1. Choose a name for your methodology and write it in Box 1 of Figure 6-J.
   2. Put your name in Box 2 and the date in Box 3.
   3. Write your purpose in Box 4.
   4. Rewrite the steps of your methodology next to the appropriate Roman numerals.

VI. Operationalize the purpose of your methodology.
   A. The straight analysis technique.
      1. List the unoperational words or phrases in your purpose.
      2. Ask someone experienced in developing methodologies to list the unoperational words and phrases in your purpose.
      3. Modify your list, if necessary.
      4. Think of the best operational word or phrase that you could substitute for the first unoperational word or phrase on your list.
      5. Does the operational word or phrase mean essentially the same thing to you as the unoperational word or phrase?
      6. If not, proceed to step 8; otherwise continue.
      7. Repeat steps four through six on the next unoperational word or phrase of your purpose. When you have defined all the terms in your purpose, go to step 13.
      8. Think of several (two to ten) operational words or phrases that, as a set, would best define the fuzzy word or phrase of your purpose and write them down.
      9. Do the operational words or phrases mean essentially the same thing to you as the unoperational word or phrase of your purpose?
      10. If you answered "no," proceed to step B; otherwise continue.

Purpose:	
Ways to Fail:	Ways to Accomplish:

Figure 6-G.

Selected Ways to Accomplish the Purpose
Ordered Ways to Accomplish the Purpose

Figure 6-H.

11. If you answered "yes," and you have now defined all the terms in your purpose, go to step 13.
12. Go to step 7.
13. Write out your purpose and its operational definition in Figure 6-K.
14. Examine your purpose and definition. Do the operational words or phrases of your definition, as a set, completely define your purpose?
15. If not, modify your definition until the operational definition is satisfactory to you.
16. If you are still not satisfied, go to step B; otherwise continue.
17. Ask someone experienced in developing methodologies to critique the definition of your purpose.
18. Modify your definition, if necessary.
19. If you are not satisfied with the definition you have produced, then go to step B; otherwise go to step VII.

B. Other ways of defining the purpose.

1. Should any of the unoperational words or phrases of our purpose be defined when your methodology is applied? One possible reason for your dissatisfaction with the definition you produced is that possibly one or more of the unoperational words

Purpose:
A. B. C.
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.
X. Y. Z.

Figure 6-I.

or phrases should only be operationally defined when your methodology is implemented in a particular situation. In that case, you should provide a process in your methodology for the defining to occur at the appropriate time, and to be done by the appropriate person or persons.

2. If your answer to the question above is yes, then skip to step 10.
3. Imagine a situation in which your methodology might be used. Now imagine that your purpose was successfully accomplished. What can you see about this situation now that indicates that your purpose has been

accomplished? Write them down.

4. Perhaps your purpose is too complex for one methodology to accomplish. If you wish, you may choose one part of the purpose and go back to step III; otherwise continue.
5. Given your response to step 3, list the operational words and phrases.
6. Given your response to step 3, list the unoperational words and phrases.
7. For each of the unoperational words and phrases, imagine that it has been accomplished when your methodology was applied. List everything that you can see that indicates to you that this word or phrase has been accomplished.
8. Perhaps your purpose is too complex for one methodology to accomplish. If you wish, you may choose some

Name of Methodology: 1.	DRAFT I
Your Name: 2.	Date: 3.
Purpose: 4.	
I. II. III. IV. V. VI. VII. VIII. IX. X. XI. XII.	

Figure 6-J.

part of the original purpose and go back to step III; otherwise continue to work on defining your purpose until you have it defined completely in operational terms.

9. When your purpose is completely defined, go to step VII.
10. There are several ways to have a person operationally define a word or phrase. Some of these ways are simple, but only work if the person has a simple meaning for the word or phrase. An approach that has been used quite often is to have the person try the easiest way first. If the easiest way doesn't work, then try the next harder but more powerful method, and so on.
    The simplest method of operationally defining a word or phrase is to substitute one operational word or phrase for the fuzzy word or phrase. The next harder method is to substitute a few operational words or phrases for the fuzzy word or phrase. These two methods are illustrated in step VI, A.
    If these methods don't work, then a more thorough method of operationally defining is needed. Step VI, B, 3 through 8, illustratates a more complex process.
11. Given your major processes in Figure 6-J, decide if the defining should be done in one of these major processes or whether there needs to be a new major process in which the necessary defining would be done.
12. If there needs to be a new major process, then add that major process to the list in Figure 6-J; otherwise indicate by an asterisk in which major process the defining will be done.

VII. Design the detailed steps of the methodology.

A. Plan the sequence of the work to be done.
   1. Look at the first major process of your methodology in Figure 6-J. Is it clear to you how you would go about doing that major process? If it is fairly obvious how that major process would be done, place a check-mark to the left of that major process.
   2. Review each of the major processes in order and place checkmarks to the left of those where it is reasonably clear to you how to accomplish that major process.
   3. Of those major processes which do not have a checkmark, choose the one which is the most crucial to the accomplishment of the purpose of your methodology.

B. Design the major steps.
   1. Write the word "To" in front of the first word in your major process.
   2. Is the result an adequate statement of the purpose of the major process? If not, what would be a good statement of the purpose of the major process?
   3. Write the purpose of the major process in Figure 6-L.
   4. In Figure 6-L, write down in what

Purpose:
Operational Words or phrases:

Figure 6-K.

ways you can accomplish your purpose.
5. In Figure 6-L, write down in what ways you can accomplish your purpose, avoiding all the problems.
6. Imagine a situation in which your purpose is being accomplished. Write down what is being done to accomplish the purpose, in Figure 6-L.
7. Have an experienced methodologist using your purpose do steps four through six.
8. Cross off the list of steps in Figure 6-L, Ways to Accomplish, those steps you decide are not necessary.
9. Where two or more items are similar and only one is needed, cross off those you will not need.
10. Write, in Figure 6-M under the heading, Selected Ways to Accomplish the Purpose, those items in Figure 6-L which have not yet been eliminated.

C. Order the major steps.
1. Of the list of Selected Ways to Accomplish the Purpose, in Figure 6-M, which one would have to be accomplished first in order to accomplish the rest? Write it down as number one (1) under the heading, Ordered Ways to Accomplish the Purpose.
2. If this first step were actually accomplished, which one of the remaining steps above would now have to be accomplished in order to accomplish the rest? Write it down as number two (2).
3. If these first two steps were actually accomplished, which one of the remaining steps would be next? Write it down as number three (3).
4. Continue this process until you have put all the items in order.
5. Check the ordered ways of accomplishing the purpose in Figure 6-M. Is this order logical?
6. Make any changes that are necessary.
7. For each item in Ordered Ways of Accomplishing the Purpose in Figure 6-M, check to see if the item is stated procedurally.
8. If a step is not stated procedurally, rewrite it so that it is.
9. These steps are now the major steps of your major process.
10. Rewrite these major steps in Figure 6-N next to the appropriate number.

D. Test the completeness of the major steps.
1. Look at step 1 in Figure 6-N and ask yourself if anything has to be done before this step in order to accomplish the purpose.
2. If so, write them down next to A., B. and C. in Figure 6-N.
3. Look at the last numbered step in Figure 6-N and ask yourself if anything has to be done after this step in order to accomplish the purpose.
4. If so, write them down next to X., Y. and Z. in Figure 6-N.
5. Show Figure 6-N to an experienced methodologist and ask her/him to critique it and make suggestions.
6. Consider the comments and sugges-

Purpose:	
Ways to Fail	Ways to Accomplish

Figure 6-L.

tions and make whatever changes you decide are appropriate.

7. Look at the purpose of your methodology in Figure 6-J.
8. Look at the first major step of your major process in Figure 6-N.
9. Ask yourself, "If I did this step, would this prevent or hinder the accomplishment of the purpose of the methodology?"
10. If the answer is yes, modify this step or the whole major process if necessary, and then try steps seven through ten again.
11. If the answer is no, then repeat this exercise with the next major step until you have done them all.
12. Rewrite the major steps of your major process, in Figure 6-O.

E. Design the major steps for each major process.

1. Make a set of worksheets like Figures 6-L through 6-O.
2. Go to step VII, A, 3. and build the major steps for the next major process.
3. Continue this process until you have identified the major steps of each major process.
4. Put the Figure 6-O for each Major

Selected Ways to Accomplish the Purpose
Ordered Ways to Accomplish the Purpose

Figure 6-M.

Process in order and staple all of them together. This is Draft II of your methodology.

VIII. Test and then revise the purpose and/or procedures if necessary.

A. Determine if you are ready to field-test your methodology.
   1. Look at the major steps of Draft II of your methodology.
   2. Would it be possible for you to try to

Major Process: Purpose:
A. B. C.
1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13.
X. Y. Z.

Figure 6-N.

carry out these steps in a simple situation?
3. If the answer is yes, skip to step VIII, D; otherwise go to step VIII, B.

B. Perform a test of the logic and completeness of your methodology.
1. Look at the first two steps of your methodology.
2. Imagine that the first step is done.
3. Should anything else be done before the second step is done?
4. If the answer is "yes," then there is a break in continuity between these two steps. Put a capital B in the space between the two steps.
5. If the answer is "no," then there is no break in continuity between these two steps.
6. Look at steps two and three of your methodology.
7. Imagine that step two is done.
8. Should anything else be done before

Name of Methodology: DRAFT II Name of Major Process:	
Your Name:	Date:
Purpose:	
A. B. C. D. E. F. G. H. I. J. K. L.	

Figure 6-O.

the third step is done?
9. If the answer is "yes," then there is a break in continuity between the two steps. Put a capital B in the space between these two steps.
10. Continue this process until you have tested each pair of steps in your methodology.
11. Look at the first step of your methodology.
12. Imagine that you are trying to explain to someone else how to do this step.
13. If much explanation is needed, then the step is very unoperational. Put a capital F (for Fuzzy) to the left of the step.
14. If little or no explanation is needed, then the step does not need any work on it at the moment.
15. Repeat this process with each step of your methodology.

C. Make improvements in your methodology.
1. Look at the first B or F on Draft II of your methodology.
2. Is it clear to you how you would solve the problem?
3. If the answer is "no," then use the procedure for step VII to help you either to design the steps of the fuzzy (F) major step or to figure out what major step is missing which causes the break (B) in continuity.
4. If the answer is "yes," then look at the next B of F and repeat this process until you either are ready to do a field test (step VIII, D.) or until you have designed solutions for all of your B's and F's.
5. When you have completed the design of solutions for all of the problems identified, design a field-test for your methodology. This process begins in the next step below.

D. Field test the methodology.
1. The first field-test should be done upon the whole methodology under the simplest possible conditions.
   a. In Figure 6-P, write the name of your methodology and the purpose.
   b. Do an analysis of the simplest possible conditions for your methodology in Figure 6-P.
   c. Make a list of possible places to field-test your methodology.
   d. For each of these possible places, see how close it comes to your conditions for a simplest possible field-test.
   e. Take the situation that comes closest to your requirements and see if you will be permitted to do your field-test.
   f. If not, try the next-closest place until you can do your field-test. If necessary, go back to step e. above.
   g. Make a set of forms like Figure 6-Q.
   h. In the first column, write the step number or letter of the first step of your methodology.
   i. Perform the step and enter in the second column what you actually did. Tape record conversations with people, if they don't mind. Save anything that is written down.
   j. Compare what you did with the step in the methodology. If there are any differences, record the differences in column three. In a first field-test, what you actually did may be more operational than the description of that action in the written step.
   k. Enter the results of doing the step in the fourth column. Reference the tape or documents, if any.
   l. If anything has gone wrong or not worked as well as you would like, describe the problem in column five.
   m. Draw a line across the worksheet at the bottom of these entries for step one of your methodology.
   n. Repeat this process for the next step of your methodology and continue until the application of the methodology is completed.
2. Make improvements in your methodology.
   a. Look at the first problem you encountered when you field-tested your methodology.
   b. Is it clear to you how you would solve the problem?
   c. If the answer is "no," then use the procedures in step VII to help you decide what needs to be changed and to build the new steps for your methodology.
   d. If the answer is "yes," then look at the next problem that you encountered in doing your field-test and repeat this process until you have designed solutions for all of the problems.
   e. Write out a new draft of your Methodology, Draft III.
3. Succeeding field-tests should be only slightly more complex than those previously conducted.
   a. Review all previously conducted field-tests; if very complex field-tests have found no problems in

any parts of the methodology, go to step VIII, E.

b. Determine what is to be field-tested--a part of the methodology or the entire methodology.
c. Conceptualize a set of conditions a little more complex than the previous field-test on the parts of the methodology to be tested.
d. Find a situation in which the methodology could be applied which is as close as possible to the specified conditions.
e. Write out the purpose (of the methodology or the part to be tested) and its operationalization.
f. Determine your goals for the field-test.
g. Develop the measures for the field-test from the operationalization of the purpose and from your goals.
h. Carry out the field-test, keeping a log as shown in Figure 6-Q.
i. Carry out the measurements.
j. use the data to revise the methodology or the part by using step VII.

E. Do conclusion-oriented research on the methodology. Consider using the Knowledge-Generation Methodology by Hutchinson (1974).

Figure 6-P.

Methodology: Purpose:
What would be the simplest possible conditions for an application of your methodology?

Figure 6-Q.

Step Done	What Actually Done	If Different From Step, Why?	Results	Problems Encountered

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